

2

AD-A205 218

AD-A205 218

APPROVED FOR PUBLIC RELEASE
DISTRIBUTION UNLIMITED

REPORT NO. 88-R-05
AFPEA PROJECT NO. 88-P-116

Susan M. Hughey
Mechanical Engineer
AUTOVON 787-3362
Commercial (513) 257-3362

PERFORMANCE ORIENTED PACKAGING TESTING OF
CNU-131/E STEEL MAVERICK MISSILE CONTAINER

HQ AFLC/DSTZ-
AIR FORCE PACKAGING EVALUATION ACTIVITY
Wright-Patterson AFB OH 45433-5999

15 DECEMBER 1988

DTIC
ELECTE
3 MAR 1989
S D
E

89 3 03 067

NOTICE

When government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related government procurement operation, the United States Government thereby incurs no responsibility whatsoever, and the fact that the government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data, is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto. This report is not to be used in whole or in part for advertising or sales purposes.

ABSTRACT

Ogden Air Logistics Center (OO-ALC/MMWM), Hill Air Force Base, Utah 84056-5609 requested assistance from the Air Force Packaging Evaluation Activity (AFPEA) to conduct Performance Oriented Packaging (POP) testing on a steel Maverick missile container (CNU-131/E).

The CNU-131/E container was fabricated by the Champion Company, Springfield, OH. The containers are environmentally sealed with a humidity indicator, desiccant port, and a pressure relief valve. The containers are designed to protect one AGM-65A/B/C/D all-up-round Maverick missile during world-wide shipment, storage, and handling. The containers will also be used for one missile without the guidance unit and for one missile without the guidance unit and the hydraulic actuation system.

The test plan used for the container was derived from United Nation (UN) Standard (Ref. ICAD 4.3), UN "Transport of Dangerous Goods", and DOD Hazardous Materials Packaging Test Plan.

Results of the tests conducted on the containers were acceptable. The containers did successfully pass the POP tests, as prescribed by the UN test criteria. *Champion Container Co.*

Approved by	
NEC	X
DTIC	
Unrec	
Justified	
By	
Distribution/	
Availability Codes	
Avail and/or	
Dist	Special
A-1	

PREPARED BY: *Susan M Hughey*
SUSAN M. HUGHEY
Mechanical Engineer
AF Packaging Evaluation Activity

PUBLICATION DATE:

REVIEWED BY: *Ted Hinds*
TED HINDS
Chief, Design Branch
AF Packaging Evaluation Activity

APPROVED BY: *Charlie P. Edmonson*
CHARLIE P. EDMONSON
Chief
AF Packaging Evaluation Activity

TABLE OF CONTENTS

	<u>Page</u>
ABSTRACT.....	i
TABLE OF CONTENTS.....	ii
INTRODUCTION	
BACKGROUND.....	1
PURPOSE.....	1
TEST SPECIMEN.....	1
TEST OUTLINE AND TEST EQUIPMENT.....	1
TEST PROCEDURES AND RESULTS.....	2
TEST NO. 1, UN DROP TEST.....	2
TEST NO. 2, UN STACKING TEST.....	2
CONCLUSION.....	2
TABLE I, CONTAINER TEST PLAN.....	3
FIGURE 1, CONTAINER CONFIGURATION.....	4
FIGURE 2, CONTAINER FORWARD END.....	5
FIGURE 3, AFT END, RUBBER PAD.....	5
FIGURE 4, COVER, AFT END, ABRASION.....	6
FIGURE 5, BASE, FORWARD END, DEFORMATION.....	6
FIGURE 6, COVER, FORWARD END, DEFORMATION.....	7
REPORT DOCUMENTATION PAGE.....	8
DISTRIBUTION LIST.....	10

INTRODUCTION

BACKGROUND: Ogden Air Logistics Center (OO-ALC/MMWMM), Hill Air Force Base, Utah 84056-5609 requested assistance from the Air Force Packaging Evaluation Activity (AFPEA) to conduct Performance Oriented Packaging (POP) testing on a steel Maverick missile container (CNU-131/E). The CNU-131/E container was fabricated by the Champion Company, Springfield OH.

PURPOSE: The purpose of this project was to determine whether the CNU-131/E container would not spill its contents, the AGM-65A/B/C/D all-up-round (AUR) Maverick missile. The container will also be used for shipment, storage, and handling of the missile less the guidance unit (GU) and the missile less both the GU and the hydraulic actuation system (HAS). The United Nations (UN) hazard code for the missile is class 1.1F. The packing code is Group II, with the packing method of E146.

TEST SPECIMEN

Two containers (serial numbers 1997 and 909-1-1) were sent from OO-ALC. The corners of the containers were numbered from the aft end (see figure 1).

DESIGN: The CNU-131/E is a controlled-breathing container with a pressure relief valve, a humidity indicator, and a desiccant port. The container is designed to limit the transmission of shocks to the missile at 30G or less when subjected to the conditions in AFSC Specification 1308. Thirty t-bolts attach the container cover to the container base. The missile is secured to the shock isolation system with a forward and aft clamp.

CONSTRUCTION: The container consists of a steel cover and base with an elastomeric shock mount system for shock isolation. A gasket provides a seal between the container base and the container cover.

TEST OUTLINE AND TEST EQUIPMENT

TEST PLAN: Tests were conducted in accordance with table I. Test methods and procedures used were as outlined in UN Standard (Ref. ICAD 4.3), UN "Transport of Dangerous Goods", and DOD Hazardous Materials Packaging Test Plan.

TEST CONTAINERS: The tests in this report were performed on CNU-131/E, serial number 1997. Only one container was used for testing since the tests were severe and it would be too costly to provide a new container for each drop.

TEST LOADS: All tests were conducted using the heaviest missile the container was designed for. The test load was an inert training missile weighing approximately 460 pounds. A container base loaded with 2500 pounds (three times the gross weight of a container with a light standard load) was also used for test number 2 to simulate stacked containers.

TEST SITES: Testing was conducted at AFPEA, HQ AFLC/DSTZ, Building 70, Area C, Wright-Patterson AFB OH. The equipment required for testing was a temperature chamber and a forklift truck.

TEST PROCEDURES AND RESULTS

UN DROP TEST

Test No. 1: At ambient temperature, the container was dropped flat on the bottom, side 2 (long side), the top, side 3 (short side), and top corner 3-4. The container shall not spill its contents.

Results: Visual inspection revealed that side 3 had deformed (see figure 2). The container was opened and the following damage was found: the missile had traveled inside the container sliding the rubber pad forward on the aft clamp (see figure 3) and abrading the container cover (see figure 4). Also, the forward end of the missile hit and deformed the container cover and base (see figures 5 and 6). However, the container did not spill its contents. Results of this test are acceptable.

UN STACKING TEST

Test No. 2: At ambient temperature, a superimposed load of 2500 pounds was placed on the container for 24 hours. The container shall not permanently deform.

Results: The container was dimensionally checked and no permanent deformation occurred during the stacking test. The results of this test are acceptable.

CONCLUSION

1. The container successfully passed the POP tests, as prescribed by the UN test criteria.

TABLE I.

AIR FORCE PACKAGING EVALUATION ACTIVITY (Container Test Plan)						AFPEA PROJECT NUMBER 88-P-116	
CONTAINER SIZE (L x W x D)(INCHES)		WEIGHT (LBS)		CUBE (CU. FT.)	QUANTITY	DATE	
INTERIOR:	EXTERIOR:	GROSS:	ITEM:				
	105 x 26 x 28	830	460	44	2	15 Sep 88	
ITEM NAME AGM-65 Maverick Missile				MANUFACTURER Champion Company			
CONTAINER NAME CNU-131/E (UN Tests)					CONTAINER COST		
PACK DESCRIPTION Steel Container							
CONDITIONING As noted below.							
TEST NO.	REF STD/SPEC AND TEST METHOD OR PROCEDURE NO'S	TEST TITLE AND PARAMETERS		CONTAINER ORIENTATION	INSTRUMENTATION		
1.	<u>UN DROP TEST</u> *(9.7.3)	Drop height 1.2m (3.94 ft) as required for Packaging Group II. The container shall not spill its contents. A different container may be used for each drop.		One each flat drop on the bottom, top, long side, short side and a corner. Total of 5 drops. Test with the heaviest AUR.			
2.	<u>UN STACKING TEST</u> (9.7.6)	Simulate stacking to a minimum height of 3m (9.84 ft) for 24 hours. There shall be no permanent deformation.**					
COMMENTS: * Figures in parenthesis refer to UN "Orange Book" requirements. ** The superimposed load test in MIL-STD-648 exceeds the UN stacking test.							
PREPARED BY: <i>Susan Hughey</i> Susan Hughey, Mechanical Engineer				APPROVED BY: <i>Ted Hinds</i> TED HINDS, Chief, Design Br., AFPEA			

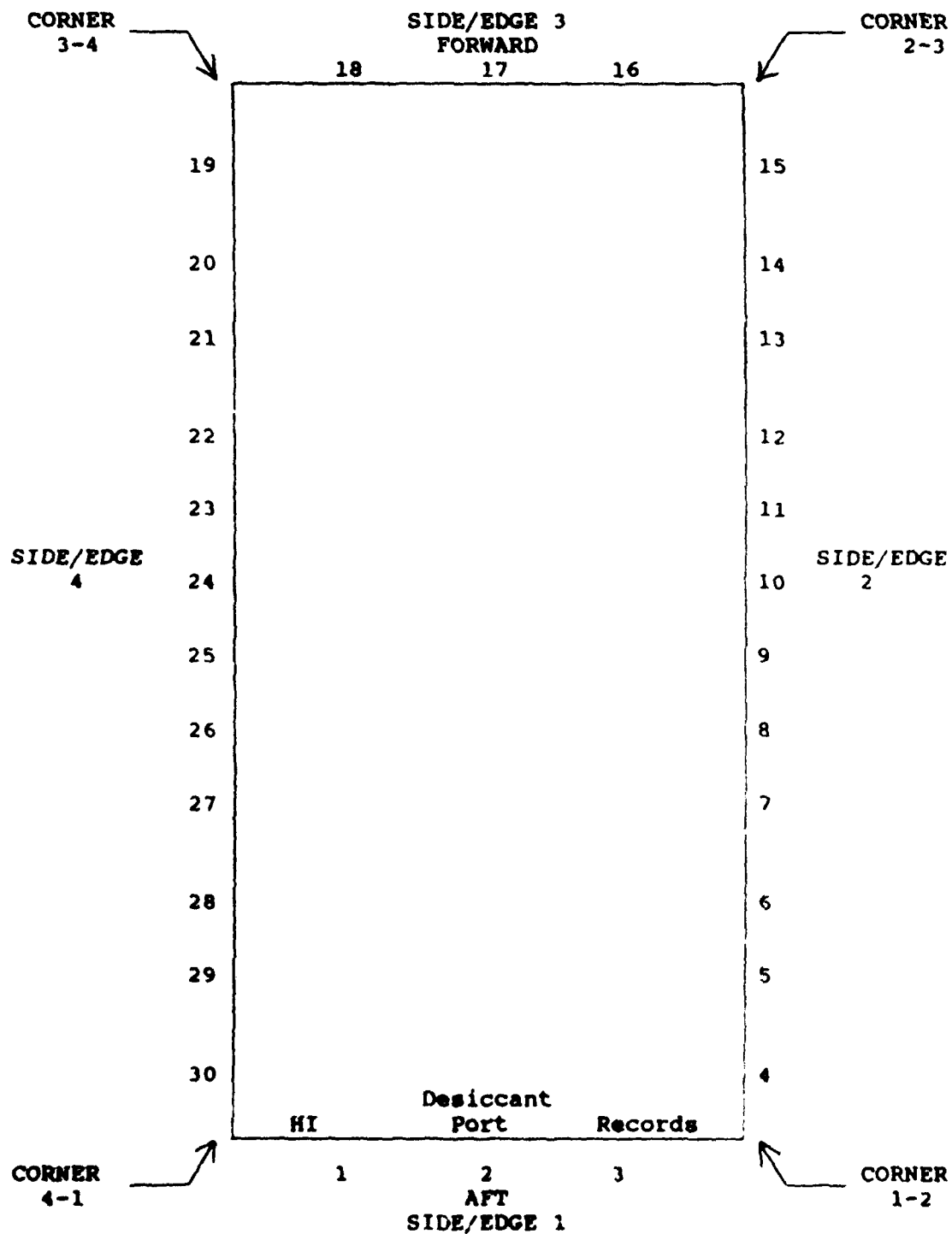


FIGURE 1. CONTAINER CONFIGURATION

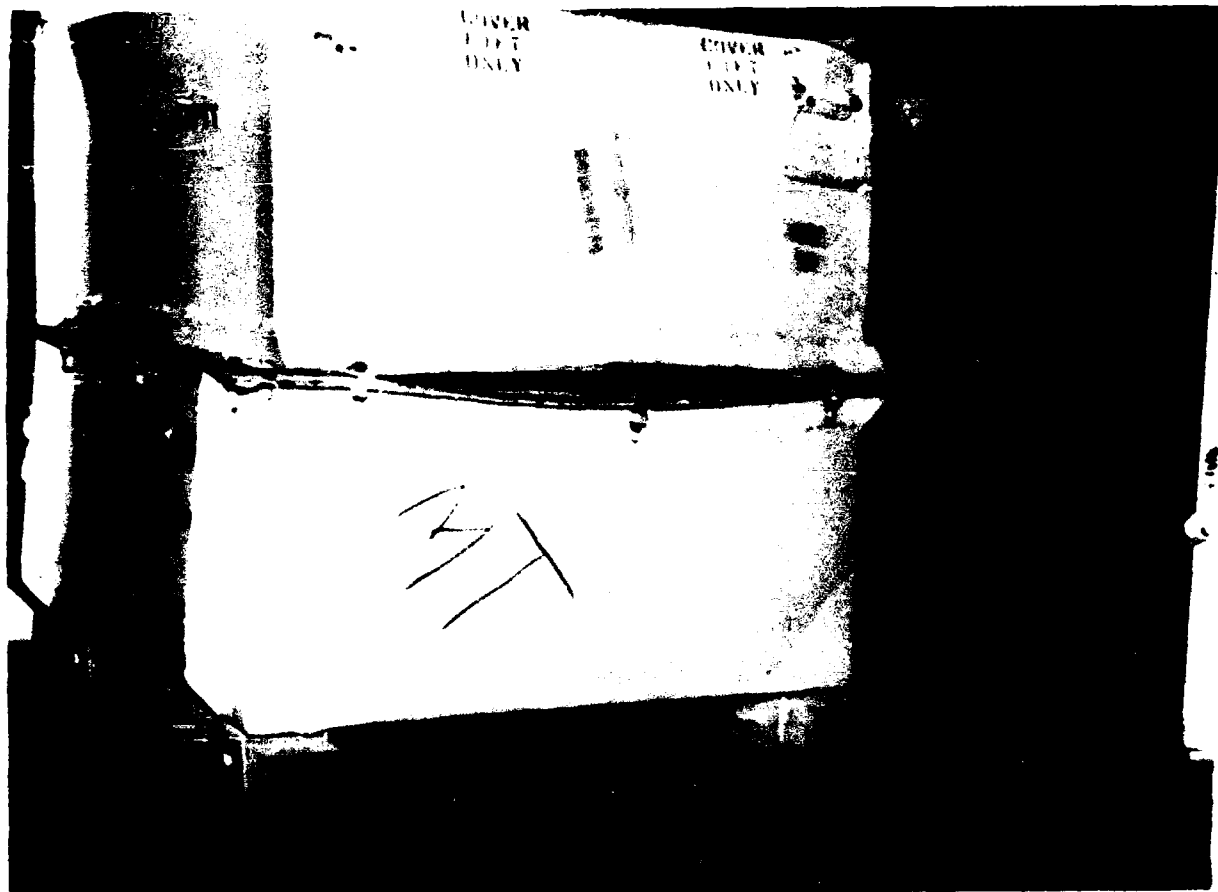


FIGURE 2. CONTAINER FORWARD END.



FIGURE 3. AFT END, RUBBER PAD.

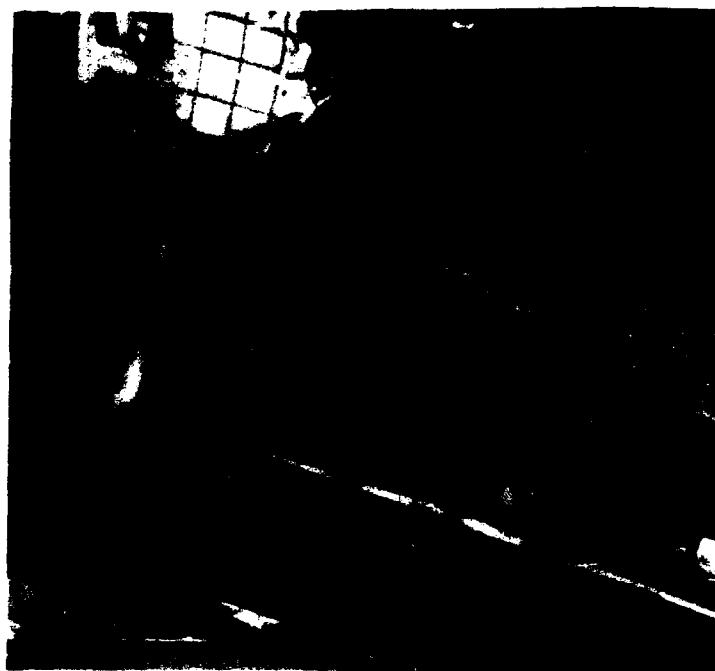


FIGURE 4. COVER, APT END, ABRASION.

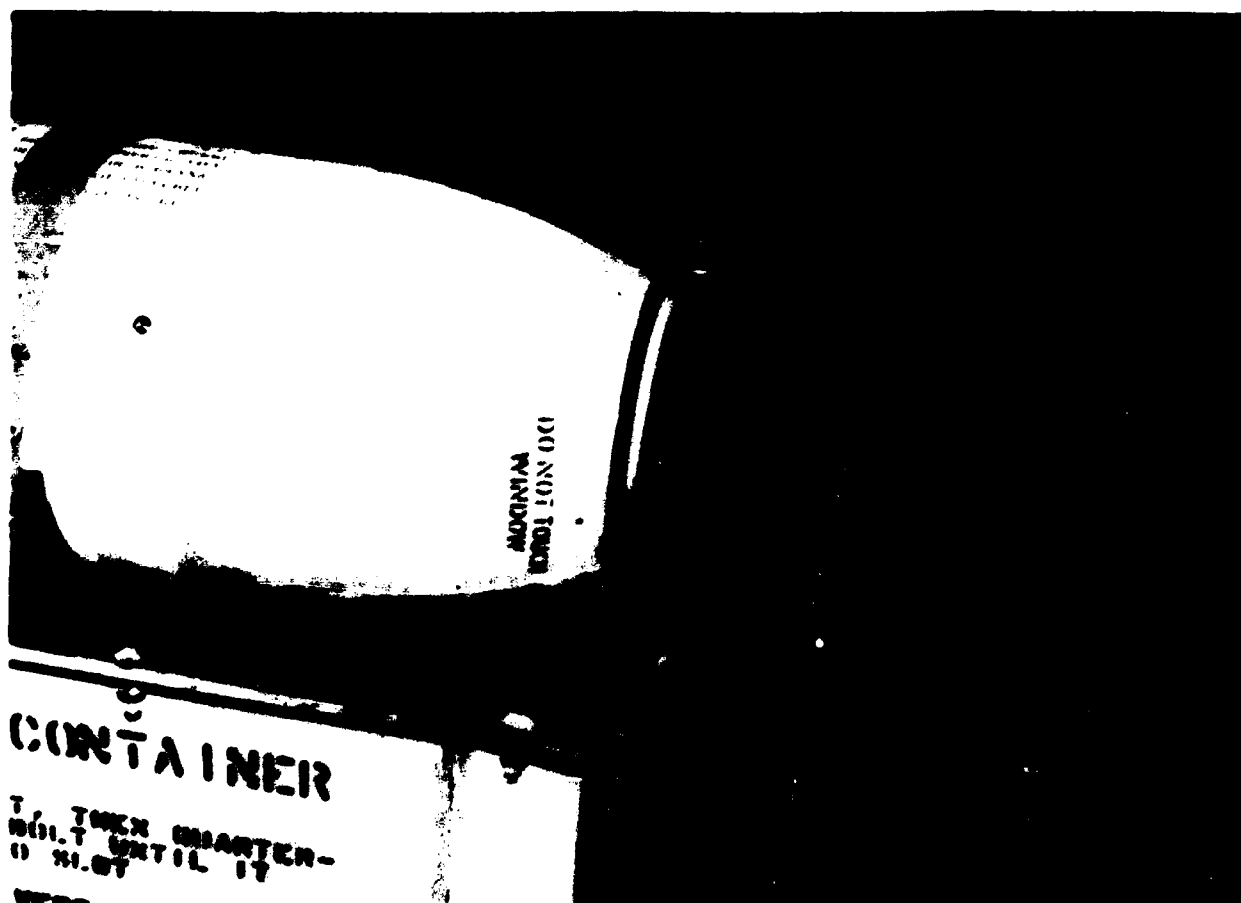


FIGURE 5. BASE, FORWARD END, DEFORMATION.

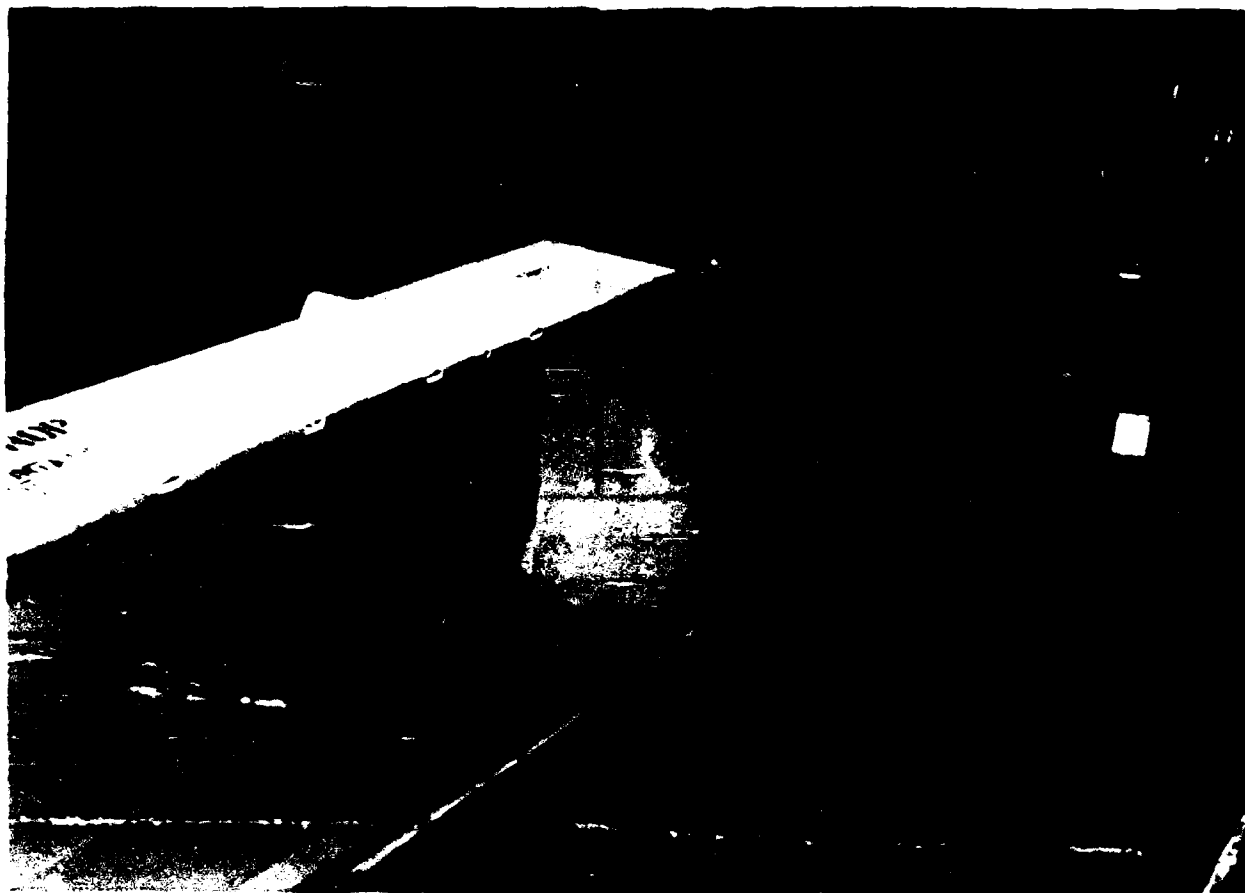


FIGURE 6. COVER, FORWARD END, DEFORMATION.

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED			1b. RESTRICTIVE MARKINGS		
2a. SECURITY CLASSIFICATION AUTHORITY NONE			3. DISTRIBUTION / AVAILABILITY OF REPORT Approved for Public Release Distribution Unlimited		
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE					
4. PERFORMING ORGANIZATION REPORT NUMBER(S) DBTZ 88-R-05			5. MONITORING ORGANIZATION REPORT NUMBER(S)		
6a. NAME OF PERFORMING ORGANIZATION		6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION		
6c. ADDRESS (City, State, and ZIP Code) HQ AFLC/DBTZ Wright-Patterson AFB OH 45433-5999			7b. ADDRESS (City, State, and ZIP Code)		
8a. NAME OF FUNDING / SPONSORING ORGANIZATION		8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER		
6c. ADDRESS (City, State, and ZIP Code)			10. SOURCE OF FUNDING NUMBERS		
			PROGRAM ELEMENT NO	PROJECT NO	TASK NO
					WORK UNIT ACCESSION NO
11. TITLE (Include Security Classification) Performance Oriented Packaging (POP) of CNU-131/E Steel Maverick Missile Container					
12. PERSONAL AUTHOR(S) Susan M. Hughey					
13a. TYPE OF REPORT Final		13b. TIME COVERED FROM Sep 88 TO Oct 88		14. DATE OF REPORT (Year, Month, Day) 88-Dec-15	
15. PAGE COUNT 20					
16. SUPPLEMENTARY NOTATION					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP			
			Maverick Missile Testing, Performance Oriented Packaging		
			Testing, United Nation's Testing, CNU-131/E		
19. ABSTRACT (Continue on reverse if necessary and identify by block number)					
<p>Ogden Air Logistics Center (OO-ALC/MMWMM), Hill Air Force Base, Utah 84056-5609 requested assistance from the Air Force Packaging Evaluation Activity (AFPEA) to conduct Performance Oriented Packaging (POP) testing on a steel Maverick missile container (CNU-131/E).</p> <p>The CNU-131/E container was fabricated by the Champion Company, Springfield, OH. The containers are environmentally sealed with a humidity indicator, desiccant port, and a pressure relief valve. The containers are designed to protect one AGM-65A/B/C/D all-up-round Maverick missile during world-wide shipment, storage, and handling. The containers will also be used for one missile without the guidance unit and for one missile without the guidance unit and the hydraulic actuation system.</p>					
20. DISTRIBUTION / AVAILABILITY OF ABSTRACT <input type="checkbox"/> UNCLASSIFIED/UNLIMITED <input checked="" type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION Unclassified		
22a. NAME OF RESPONSIBLE INDIVIDUAL Susan M. Hughey			22b. TELEPHONE (Include Area Code) (513) 257-3362		22c. OFFICE SYMBOL HQ AFLC/DBTZD

19. (Continued)

The test plan used for the container was derived from United Nation (UN) Standard (Ref. ICAD 4.3), UN "Transport of Dangerous Goods", and DOD Hazardous Materials Packaging Test Plan.

Results of the tests conducted on the containers were acceptable. The containers did successfully pass the POP tests, as prescribed by the UN test criteria.

DISTRIBUTION LIST

DTIC/FDAC Cameron Station Alexandria, VA 22304-6145	12
HQ AFLC/DSTZ Library Wright-Patterson AFB OH 45433-5999	20
HQ AFLC/DS Wright-Patterson AFB OH 45433-5999	2
HQ AFLC/DST Wright-Patterson AFB OH 45433-5999	2
HQ AFLC/DSTTP Wright-Patterson AFB OH 45433-5999	2
HQ USAF/LETT Washington DC 20330	1
HQ AFSC/LGT	1
OC-ALC/DST Tinker AFB OK 73145	1
OO-ALC/DST Hill AFB UT 84406	2
SA-ALC/DST Kelly AFB TX 78241	1
SM-ALC/DST McClellan AFB CA 95652	1
WR-ALC/DST Robins AFB GA 31098	1
ASD/AWL Wright-Patterson AFB OH 45433	1
ASD/ALXP Wright-Patterson AFB OH 45433	2
AFSC AD/YBA Eglin AFB FL 32542	2
GSA, Office of Engineering Mgt Packaging Division Washington DC 20406	1

DISTRIBUTION LIST (Cont'd)

Commander Naval Supply Systems Command Attn: N. Karl (SUP 0611F) Washington DC 20376-5000	1
Commander Naval Air Systems Command Attn: E. Panigot (AIR 41212A) Washington DC 20361	1
Commander Space and Naval Warfare Systems Command Attn: T. Corbe (Code 8218) Washington DC 20360	1
Commander Naval Facilities Engineering Command Hoffman Bldg. #2, Room 12S21 Attn: C. Manwarring (FAC 0644) Alexandria, VA 22332	1
Commanding Officer Naval Construction Battalion Center Attn: K. Pollock (Code 15611K) Port Hueneme, CA 93043	1
Commander Naval Sea Systems Command Attn: G. Mustin (SEA 66P) Washington DC 20362	1
Commander Naval Sea Systems Command Attn: F. Basford (SEA 05M3) Washington DC 20362	1
Commanding Officer Naval Aviation Supply Office 700 Robbins Avenue Attn: J. Yannello (Code EPP-A) Philadelphia, PA 19111-5098	1
Commanding Officer Navy Ships Parts Control Center P.O. Box 2020 Attn: F. Sechrist (Code 0541) Mechanicsburg, PA 17055-0788	1

DISTRIBUTION LIST (Cont'd)

Commanding Officer Naval Air Engineering Center Attn: F. Magnifico (SESD Code 9321) Lakehurst, NJ 08733-5100	1
Commanding Officer Naval Weapons Station Earle NWHC/Code 8023 Colts Neck, NJ 07722-5000	2
ASO/TEP-A 4030 700 Robbins Ave Philadelphia, PA 19111	1
US AMC Packaging, Storage, and Containerization Center/SDSTO-T Tobyhanna, PA 18466-5097	1
DLSIE/AMXMC-D US Army Logistics Mgt Ctr Ft Lee VA 23801-6034	1
US Army AMCCOM/SMCAR-AED Dover, NJ 07801-5001	1
US Army Natick Labs/STRNC-ES Natick MA 01760	1
HQ DLA/OWP Cameron Station Alexandria, VA 22304-6100	1
HQ AFLC/MMA Wright-Patterson AFB OH 45433	2
AFALC/CV Wright-Patterson AFB OH 45433	2
AFALC/OA Wright-Patterson AFB OH 45433	2
AFLC LOC/CV Wright-Patterson AFB OH 45433	2
AFLC LOC/TL Wright-Patterson AFB OH 45433	2
ASD/SDM Wright-Patterson AFB OH 45433	2

DISTRIBUTION LIST (Cont'd)

HQ TAC/LGWL	2
Langley AFB, VA 23665	
OO-ALC/DSTD	2
Hill AFB, UT 84056	
OO-ALC/MMWMM	2
Hill AFB, UT 84056-5609	